

WHAT IS CLAIMED IS:

- 1 1. A method for providing resource discovery comprising:
 - 2 sending a first request message having a first selected scope;
 - 3 analyzing whether a confirm message is received from a discovered
 - 4 resource within the first selected scope in response to the first request
 - 5 message; and
 - 6 sending a second request message having a second selected scope
 - 7 when a confirm message is not received from a discovered resource in
 - 8 response to the first request message, the second selected scope being
 - 9 greater than the first selected scope.

- 1 2. The method of claim 1 wherein the analyzing further
 - 2 comprises:
 - 3 setting a timer in response to the first request message being sent;
 - 4 detecting whether a confirm message is received before the timer
 - 5 expires; and
 - 6 terminating the resource discovery procedure when a confirm
 - 7 message is received prior to the expiration of the timer.

- 1 3. The method of claim 2 wherein the detecting further
 - 2 comprises:
 - 3 determining whether a scope increase is allowed when a confirm
 - 4 message is not received before the expiration of the timer;
 - 5 terminating the resource discovery procedure when a scope increase
 - 6 is not allowed;

7 increasing the scope to the second selected scope when a scope
 8 increase is allowed; and
 9 resetting the timer.

1 4. The method of claim 3 wherein the determining further
 2 comprises inspecting fields of a response message and determining
 3 whether a scope increase is allowed based upon the response message
 4 and policies included therein.

1 5. The method of claim 1 wherein the sending further comprises
 2 transmitting the request message to a known multicast group.

1 6. The method of claim 1 wherein the scope comprises a hop
 2 count, the hop count representing a number of nodes in a multicast tree that
 3 the request message propagates.

1 7. The method of claim 6 further comprising decrementing the
 2 hop count at a node in the multicast tree receiving the request message and
 3 forwarding the request message to a next node in the multicast tree.

1 8. The method of claim 1 wherein the request message further
 2 comprises parameters for analyzes by a node receiving the request
 3 message.

1 9. The method of claim 8 wherein the parameters further
 2 comprises hop-by-hop parameters, the hop-by-hop parameters being

3 modified by intermediate nodes during the propagation of the request
4 message in the multicast tree.

1 10. The method of claim 8 wherein the parameters further
2 comprise destination parameters, the destination parameters being used by
3 a resource being discovered using the request message to determine
4 whether the resource responds using a confirm or a reject message.

1 11. The method of claim 1 further comprising:
2 receiving the request message at a node in a multicast tree;
3 decrementing a hop count included in the scope;
4 modifying hop-by-hop parameters;
5 determining whether the hop count is equal to zero;
6 passing the request message down the multicast tree when the hop
7 count is not equal to zero;
8 examining destination parameters in the request message; and
9 unicasting a response message in response to the request message.

1 12. The method of claim 11 wherein the response message
2 comprises a decision field for indicating whether the response is a confirm
3 message or a reject message, a returned hop count representing a value of
4 the hop count field at the time the request message was received by the
5 node and a returned hop-by-hop parameter field representing a value of
6 hop-by-hop parameters received by the node in the request message after
7 modification by the node.

1 13. A method for locating an endpoint for setting up a connection,
2 the method comprising:
3 sending a first request message having a first selected scope to a
4 known multicast group;
5 setting a timer responsive to the first request message being sent;
6 detecting whether a confirm message is received from an endpoint
7 before the timer expires;
8 terminating endpoint locating when a confirm message is received
9 from an endpoint prior to the expiration of the timer;
10 determining whether a scope increase is allowed when a confirm
11 message is not received from an endpoint before the expiration of the timer;
12 terminating endpoint locating when a scope increase is not allowed;
13 increasing the scope to the second selected scope when a scope
14 increase is allowed;
15 resetting the timer; and
16 sending a second request message having the second selected
17 scope when a confirm message is not received from an endpoint in
18 response to the first request message, the second selected scope being
19 greater than the first selected scope.

1 14. The method of claim 13 wherein the determining further
2 comprises inspecting fields of a response message and determining
3 whether a scope increase is allowed based upon the response message
4 and policies included therein.

1 15. The method of claim 13 wherein the scope comprises a hop
2 count, the hop count representing a number of nodes in a multicast tree that
3 the request message propagates.

1 16. The method of claim 15 further comprising decrementing the
2 hop count at a node in the multicast tree receiving the request message and
3 forwarding the request message to a next node in the multicast tree.

1 17. The method of claim 13 wherein the request message further
2 comprises parameters for analyzes by a node receiving the request
3 message.

1 18. The method of claim 17 wherein the parameters further
2 comprises hop-by-hop parameters, the hop-by-hop parameters being
3 modified by intermediate nodes during the propagation of the request
4 message in the multicast tree.

1 19. The method of claim 17 wherein the parameters further
2 comprise destination parameters, the destination parameters being used by
3 an resource being discovered using the request message to determine
4 whether the resource responds using a confirm or a reject message.

1 20. The method of claim 13 further comprising:
2 receiving the request message at a node in a multicast tree;
3 decrementing a hop count included in the scope;
4 modifying hop-by-hop parameters;
5 determining whether the hop count is equal to zero;

6 passing the request message down the multicast tree when the hop
 7 count is not equal to zero; '
 8 examining destination parameters in the request message; and
 9 unicasting a response message in response to the request message.

1 21. The method of claim 20 wherein the response message
 2 comprises a decision field for indicating whether the response is a confirm
 3 message or a reject message, a returned hop count representing a value of
 4 the hop count field at the time the request message was received by the
 5 node and a returned hop-by-hop parameter field representing a value of
 6 hop-by-hop parameters received by the node in the request message after
 7 modification by the node.

1 22. An article of manufacture for providing resource discovery
 2 using multicast scope selection, the article of manufacture comprising a
 3 computer readable medium having instructions for causing a processor to
 4 locate a resource for establishing a connection thereto according to a
 5 method, the method comprising:
 6 sending a first request message having a first selected scope;
 7 analyzing whether a confirm message is received from a discovered
 8 resource within the first selected scope in response to the first request
 9 message; and
 10 sending a second request message having a second selected scope
 11 when a confirm message is not received from a discovered resource in
 12 response to the first request message, the second selected scope being
 13 greater than the first selected scope.

1 23. The article of manufacture of claim 22 wherein the analyzing
2 further comprises:

3 setting a timer in response to the first request message being sent;
4 detecting whether a confirm message is received before the timer
5 expires; and
6 terminating the resource discovery procedure when a confirm
7 message is received prior to the expiration of the timer.

1 24. The article of manufacture of claim 23 wherein the detecting
2 further comprises:

3 determining whether a scope increase is allowed when a confirm
4 message is not received before the expiration of the timer;
5 terminating the resource discovery procedure when a scope increase
6 is not allowed;
7 increasing the scope to the second selected scope when a scope
8 increase is allowed; and
9 resetting the timer.

1 25. The article of manufacture of claim 24 wherein the determining
2 further comprises inspecting fields of a response message and determining
3 whether a scope increase is allowed based upon the response message
4 and policies included therein.

1 26. The article of manufacture of claim 22 wherein the sending
2 further comprises transmitting the request message to a known multicast
3 group.

1 27. The article of manufacture of claim 22 wherein the scope
2 comprises a hop count, the hop count representing a number of nodes in a
3 multicast tree that the request message propagates.

1 28. The article of manufacture of claim 27 further comprising
2 decrementing the hop count at a node in the multicast tree receiving the
3 request message and forwarding the request message to a next node in the
4 multicast tree.

1 29. The article of manufacture of claim 22 wherein the request
2 message further comprises parameters for analyzes by a node receiving the
3 request message.

1 30. The article of manufacture of claim 29 wherein the parameters
2 further comprises hop-by-hop parameters, the hop-by-hop parameters being
3 modified by intermediate nodes during the propagation of the request
4 message in the multicast tree.

1 31. The article of manufacture of claim 29 wherein the parameters
2 further comprise destination parameters, the destination parameters being
3 used by an resource being discovered using the request message to
4 determine whether the resource responds using a confirm or a reject
5 message.

1 32. The method of claim 22 further comprising:
2 receiving the request message at a node in a multicast tree;
3 decrementing a hop count included in the scope;

4 modifying hop-by-hop parameters;
 5 determining whether the hop count is equal to zero;
 6 passing the request message down the multicast tree when the hop
 7 count is not equal to zero;
 8 examining destination parameters in the request message; and
 9 unicasting a response message in response to the request message.

1 33. The method of claim 32 wherein the response message
 2 comprises a decision field for indicating whether the response is a confirm
 3 message or a reject message, a returned hop count representing a value of
 4 the hop count field at the time the request message was received by the
 5 node and a returned hop-by-hop parameter field representing a value of
 6 hop-by-hop parameters received by the node in the request message after
 7 modification by the node.

1 34. A discoverer, comprising:
 2 a discovery unit; and
 3 an application, operatively coupled to the discovery unit, the
 4 application sending a notification to the discovery unit for locating an
 5 endpoint application;
 6 wherein the discovery unit sends a first request message having a
 7 first selected scope to a multicast group, analyzes whether a desired confirm
 8 message is received from an endpoint application in response to the first
 9 request message; and sends a second request message having a second
 10 selected scope when a desired confirm message is not received from the

11 endpoint application in response to the first request message, the second
 12 selected scope being greater than the first selected scope.

1 35. The discoverer of claim 34 further comprising a timer for
 2 setting a window for receiving the desired confirm message, wherein the
 3 discovery unit sets the timer in response to the first request message being
 4 sent, detects whether a confirm message is received before the timer
 5 expires and terminates the location of an endpoint when a confirm message
 6 is received prior to the expiration of the timer.

1 36. The discoverer of claim 35 wherein the discovery unit
 2 determines whether a scope increase is allowed when a desired confirm
 3 message is not received before the expiration of the timer, terminates the
 4 location of an endpoint when a scope increase is not allowed, increases the
 5 scope to the second selected scope when a scope increase is allowed and
 6 resets the timer.

1 37. The discoverer of claim 36 wherein the discovery unit
 2 determines whether a scope increase is allowed when a confirm message is
 3 not received before the expiration of the timer based upon the received
 4 response message and policies included therein.

1 38. The discoverer of claim 34 wherein the scope comprises a hop
 2 count, the hop count represent a number of nodes in a multicast tree that
 3 the request message propagates.

1 39. The discoverer of claim 34 wherein the request message
2 further comprises parameters for analyzes by a node receiving the request
3 message.

1 40. The discoverer of claim 39 wherein the parameters further
2 comprises hop-by-hop parameters, the hop-by-hop parameters being
3 modified by intermediate nodes during the propagation of the request
4 message in the multicast tree.

1 41. The discoverer of claim 39 wherein the parameters further
2 comprise destination parameters, the destination parameters being used by
3 an endpoint to determine whether the resource responds using a confirm or
4 a reject message.

1 42. The discoverer of claim 34 wherein the application and the
2 discovery unit are co-located.

1 43. The discoverer of claim 34 wherein the application and the
2 discovery unit are not co-located.

1 44. The discoverer of claim 43 wherein the discovery unit
2 comprises a base transceiver station, a base station controller or a mobile
3 services switching center.

1 45. The discoverer of claim 43 wherein the application comprises a
2 mobile terminal.